

Department of Higher Education
University of Computer Studies, Yangon
Fourth Year (B.C.Tech.)
Final Examination
Database Management System (CT – 401)
September, 2018

Answer all questions.

Time Allowed: 3 hours

- I. Define any **five** of the following: **(25 marks)**
- (i) Deadlock
 - (ii) Media Recovery
 - (iii) Mandatory Access Control
 - (iv) Audit Trail
 - (v) The Golden Rule
 - (vi) ACID properties
 - (vii) Commit operation and Roll back operation
- II. Consider the following relational schema:
- Employee (emp#, ename, address)
Product (prod#, pname, color, price)
Sale (emp#, prod#, qty)
- (a) Using appropriate syntax, define security constraints as necessary to give: **(15 marks)**
- (i) User 'Alex' INSERT and RETRIEVE privilege over the employee relvar.
 - (ii) User 'John' RETRIEVE and UPDATE privileges over the pname and price (only) attributes of product relvar.
 - (iii) User 'Blake' full privileges(RETRIEVE, UPDATE, INSERT, DELETE) over tuples for 'Samsung' product.
 - (iv) User 'Clark' can RETRIEVE and DELETE privileges over product information, but only for products which was sold by 'Cathy'.
 - (v) User 'David' can RETRIEVE total shipment quantity per employee, but not individual quantities.
- (b) Using appropriate syntax, write the integrity constraints. **(15 marks)**
- (i) Product price must be in the range 5000 to 10000.
 - (iv) Every 'Samsung' product must be sold by 'Pinky'.
 - (v) The only legal product names are 'Samsung', 'Acer', 'Dell', 'Apple', 'MSI', 'Lenovo', 'HP'.
- (c) For each of your answers to above question II(b), state whether the constraint is relvar constraint or database constraint or type constraint. **(5 marks)**
- III (a) Work through the RSA public key encryption algorithm scheme with $p=3$, $q=5$ and $e=11$ for plaintext IS. **(8 marks)**
- (b) Decrypt the following cypher text using the key 'APRIL'. **(7 marks)**
FNWAL+JPVJC+FPEXE+ABWNE+AYEIP+SUSVD
- IV (a) Define the intent locking protocol. **(5 marks)**
- (b) Describe the definition of lock types X, S, IX, IS, SIX. **(5 marks)**

(c) Give the corresponding precedence graph and compatibility matrix of lock types X, S, IX, IS, SIX. **(5 marks)**

V. Demonstrate the query decomposition steps using a Divide and Conquer strategy for the query “Get suppliers numbers for suppliers who supply the part stored in London in a quantity greater than 200.” Draw the decomposition tree for above query.

(10 marks)